

REMARKS

Claims 1-3, 5-17 and 20-25 are currently pending. Claims 1 and 15 have been amended herein. No new matter has been added. Applicants request reconsideration of the pending claims in view of the foregoing amendments and following discussion.

Claims 1-3, 5, 6, 15, 16, 20 and 22-25 have been rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 5,067,458 ("Bailey").

In order to reject a claim under 35 U.S.C. § 102(b), the Office must demonstrate that each and every limitation is identically disclosed in a single prior art reference. See Scripps Clinic & Research Foundation v. Genentech, Inc., 18 U.S.P.Q.2d 1001, 1010 (Fed. Cir. 1991). The identical invention must be shown in as complete detail as is contained in the claim. M.P.E.P. § 2131.

Amended independent claim 1 relates to a method of controlling auto-ignition timing in an internal combustion engine cylinder that is coupled to at least one prechamber, the method including precisely controlling a timing of auto-ignition in the at least one prechamber, the auto-ignition in the at least one prechamber producing hot gas jets, inducing auto-ignition in the cylinder by introducing the hot gas jets from the at least one prechamber into the cylinder, and enriching a fuel-air mixture in the at least one prechamber to a rich level. Claim 1, as amended, further recites that the auto-ignition in the at least one prechamber is induced by a pressure increase within the at least one prechamber with built-up pressure from the cylinder.

It is respectfully submitted that Bailey does not disclose, or even suggest, inducing an auto-ignition in a prechamber by increasing the pressure within the prechamber with built-up pressure the cylinder, as required by claim 1. Instead, according to Bailey, an "igniting means 30" is used to ignite the portion of combustible mixture which is admitted into the auxiliary combustion chamber 26. (See col. 4, lines 53-55). Here, the igniting means 30 preferably includes a glow plug adapted to be electrically energized to a predetermined elevated temperature which is sufficient to instantaneously ignite the combustible mixture which comes in contact with the glow plug. (See col. 5, lines 20-26). In this regard, Bailey provides that:

Upon opening the needle valve 38, a portion of the pressurized combustible mixture 18 flows very rapidly into the auxiliary combustion chamber 26. Upon surface contact with the heated glow plug 36, the combustible mixture is ignited, gas pressure rises, and the resulting expanding burning gases are discharged from the auxiliary combustion chamber 26 and into the main chamber 14.

(Col. 7, lines 14-21). (Emphasis added). Hence, Bailey contemplates introducing the gas mixture into the auxiliary combustion chamber 26 merely for the purpose of exposing the gas mixture to a heated glow plug, which ignites the gas mixture by direct exposure to a dramatic increase in temperature. Bailey does not disclose or suggest introducing the gas mixture into the chamber 26 and inducing an auto-ignition in the chamber 26 by increasing the pressure in the chamber 26 with built-up pressure from the cylinder, as required by claim 1. Accordingly, for at least these reasons, amended claim 1 and its dependent claims 2, 3, 5 and 6 are not anticipated by Bailey.

Since independent claim 15 has been amended in a manner similar to claim 1, it is submitted that claim 15 and its dependent claims 16, 20 and 22-25 are also not anticipated by Bailey.

Claims 1-3, 5-8, 10-17, 20 and 22 have been rejected under 35 U.S.C. § 103(a) as unpatentable over Bailey in view of U.S. Patent No. 6,694,944 (“Agama”).

In rejecting a claim under 35 U.S.C. § 103(a), the Examiner bears the initial burden of presenting a prima facie case of obviousness. In re Rijckaert, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). To establish prima facie obviousness, three criteria must be satisfied. First, there must be some suggestion or motivation to modify or combine reference teachings. In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). This teaching or suggestion to make the claimed combination must be found in the prior art and not based on the application disclosure. In re Vaeck, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). Second, there must be a reasonable expectation of success. In re Merck & Co., Inc., 800 F.2d 1091, 231 U.S.P.Q. 375 (Fed. Cir. 1986). Third, the prior art reference(s) must teach or suggest all of the claim limitations. In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974).

As explained above, Bailey does not disclose, or even suggest, the features of claim 1 with respect to inducing an auto-ignition in a prechamber by increasing the pressure within the prechamber with built-up pressure from the cylinder. It is respectfully submitted that Agama likewise does not disclose, or even suggest, these features of claim 1. Instead, Agama uses pressure built-up in the prechamber itself. That is, Agama uses a prechamber piston 44 to compress the fuel and air mixture in the prechamber 42 so as to cause the mixture therein to auto-ignite. (See col. 4, lines 38-46). Indeed, such a prechamber piston 44 is not required according to the claimed subject matter of amended claim 1, which uses pressure built up in the cylinder to auto-ignite the mixture in the prechamber.

For at least this reason, it is submitted that claim 1 and its dependent claims 2, 3, 5-8 and 10-14 are not rendered obvious by Bailey in view of Agama.

Since independent claim 15 has been amended in a manner similar to claim 1, it is submitted that Bailey in view of Agama also does not render obvious independent claim 15 or its pending dependent claims 16, 17, 20 and 22.

Claims 9 and 21 have been rejected under 35 U.S.C. § 103(a) as unpatentable over Agama in view of Bailey, and further in view of U.S. Patent No. 4,898,126 to Merritt ("Merritt") or U.S. Patent No. 5,109,817 to Cherry ("Cherry").

Claim 9 depends from independent claim 1, and claim 21 depends from independent claim 15. Neither the Merritt reference nor the Cherry reference cures the deficiencies of the Agama and Bailey references as applied against parent claims 1 and 15, since both Merritt and Cherry fail to teach or suggest a prechamber in which auto-ignition takes place, let alone inducing the auto-ignition by increasing the pressure within the prechamber with built-up pressure from the cylinder.

For at least this reason, it is submitted that claims 9 and 21 are patentable over Agama in view of Bailey and Merritt or Cherry.

CONCLUSION

In view of all the above, it is believed that pending claims 1-3, 5-17 and 20-25 are in allowable condition. It is therefore respectfully requested that the rejections be reconsidered and withdrawn, and that the present application issue as early as possible.

Respectfully submitted,

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